

Final Report

GreenCOM/Mali

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Basic Education Expansion Project
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ACRONYMS

EE	Environmental Education
CNIECS	National Center for Public Health Information, Education and Communication
COFESFA	Women's Environmental Association in Bamako
IPN	Institut Pedagogique National
NGO	Non-governmental organization
ORTM	National Radio and Television Association
PRODEC	The Ten-Year Plan of the Ministry of Education for Education Reform
USAID	United States Agency for International Development
WALIA	Mopti-based Environmental Association

Overview of GreenCOM/Mali

The overall goal of the GreenCOM/Mali project, designed and supported by USAID/Bamako, was to work with the Ministry of Basic Education, the Ministry of the Environment, nongovernmental organizations (NGOs), media personnel, and public and community school systems to increase environmental knowledge and awareness, and to mobilize communities around environmental issues. Over the project's two years, GreenCOM/Mali worked in close collaboration with these Malian counterparts to accomplish this goal, using innovative communication and education approaches, across a wide range of Malian society.

GreenCOM activities took place in all three traditional educational sectors S formal, informal, and nonformal. The formal work sought to integrate environmental education (EE) themes and activities into the primary education system, grades 1-6. Informal educational efforts focused on a collaboration with 29 community radios S community radio has deep roots in Mali S in which GreenCOM trained local radio journalists to develop and transmit EE messages in local languages. GreenCOM's nonformal approach involved working in concert with local NGOs and community associations on neighborhood cleanup programs in Bamako.

In all these sectors, GreenCOM/Mali introduced fundamental educational innovations S applying learning directly to the Malian world; using the community as an extension of the classroom; building partnerships with communities, NGOs, the Ministry of Basic Education, the Ministry of Environment, and other donors; interdisciplinary learning; and youth development through service to the larger community. All these elements were part of GreenCOM and were new to Mali. We found real potential for initiatives in learning through community service, in civics and democracy education, and in environmental education to build on and benefit from one another. All three involve students going out into the community with problem-solving activities, and we also found that when Malian students have to choose a local problem to work on, many choose environmental problems. The current school-reform movement in Mali (PRODEC) has the opportunity to use these three areas S learning through community service, civics and democracy education, and environmental education S as catalysts for real change in Malian youth, both in-school and out-of-school.

What follows is an account of the GreenCOM/Mali program, by objectives in each sector (formal, informal, and nonformal), in terms on cross-cutting EE activities, and of lessons learned.

1. The Formal-System Schools

1.1 A complete 6th grade environmental curriculum and materials are available

As a result of GreenCOM training and materials development, an integrated EE curriculum for grades 1-6 is now in place, in the form of a Teacher's Guide (Guide de Maitre) and an accompanying Activities Booklet (Cahiers d'Activites) available for 420 teachers in over 100 schools. The project trained more than 50 educational advisers, inspectors, and regional education directors in the regions of Bamako, Koulikoro, Mopti, and Sikasso. GreenCOM distributed 350 copies of the Teacher's Guide to the Ministry of Education's Institut Pedagogique National (IPN), 25 copies to Save the Children and 25 to World Education. Both Save the Children and World Education run their own community schools. The Teacher's Guide and the Activities Booklet are now available in Mali and have been distributed to the various GreenCOM partners.

1.2 A core team from IPN will have the capacity to train environmental trainers, ultimately resulting in increased student knowledge of environmental issues.

During 1998 and 1999, a core team of EE trainers, led by IPN, has been training teachers in EE in the regions of Koulikoro, Mopti, Bamako, and Sikasso. The IPN team has coordinated its efforts with its NGO partners (Walia, an environmental NGO in Mopti; Save the Children; and World Education) and with other EE projects, notably the European Community's environmental education program (PFIE) which is now in its tenth year. Eighteen educators from IPN, other line Ministries, and the NGOs have been trained now to be trainers of trainers in EE. During April and May 1999, IPN led a core team of EE trainers which trained more than 350 teachers and educational advisers and inspectors in the Bamako, Koulikoro, Mopti, and Sikasso regions.

1.3 Four hundred schools have environmental education materials.

Over 100 schools not only have the EE materials, the Teacher's Guide and the Activities Booklet, but also all the teachers in these schools have been trained in the use of those materials. Although GreenCOM feels it is not sound educationally to disseminate the EE materials to other 300 schools without training, GreenCOM was ready to do so. But, after consultation with USAID/Bamako and the IPN, GreenCOM has distributed 4000 copies of the Activity Booklet and 350 copies of the Teacher Guide directly to IPN instead. Based on ongoing discussions between USAID/Bamako and IPN, these materials will soon become available to many more than 300 additional schools, but this distribution will occur only after the faculties of the schools receiving the EE materials have had training in their use.

In addition to the copies given to IPN, Save the Children and World Education each received 100 copies of a student environmental notebook that contains illustrations and descriptions of Malian flora and fauna. Save the Children and World Education will distribute these EE materials to their respective schools when those schools have received GreenCOM training. Walia also received 2000 copies of the Activity Booklet, Save the Children 500, and World Education 100. The rest were distributed to other GreenCOM partners: CNI ECS, COFESFA, PRODEC, the World Bank project on Pedagogie Convergente, the new USAID-financed project Programme Demisenya Yiriwari, and the Minister of the Environment. Environmental posters were distributed as well.

What the Children Learned

An evaluation was conducted to determine if there were any changes in environmental attitudes and knowledge among students in grades 3rd through 6th in the 18 schools participating in the GreenCOM supported program. There were two submissions of the test. The first took place six weeks after the teachers had been trained in the use of the teacher's guide. The second was administered, seven months later, during the last week of the 1998-99 school year. Thirty children per classroom in each one of those schools were selected at random to participate in the study. A total of 1,975 3rd and 4th graders, and 1935 5th and 6th graders took part.

Teachers in fact had integrated environmental topics into different subjects in their classes. Based on the data gathered for teachers, they were grouped into categories reflecting three levels of integration of environmental topics: "no integration", "partial integration", and "more integration." Results indicated that:

- Knowledge and attitude scores increased significantly between measurements, except for attitudes among the group of 3rd and 4th graders.
- The gains in both environmental knowledge and attitudes over time were larger for students in classrooms where teachers showed a higher level of environmental integration.
- Partial integration of environmental content affects student performance differently depending on the grade. 3rd and 4th graders in classrooms where teachers integrated environmental content less frequently showed a significant *decrease* in both knowledge and attitudes. This trend was however not observed among 5th and 6th grades in either the knowledge or the attitude test.
- Better performance from the pre-test to the post-test was observed among students from community schools when compared to students from the other two types of schools. Furthermore, performance on both the knowledge and attitude tests decreased significantly in the 3rd and 4th graders from PFIE schools.

100 to IPN, 200 to WALIA, 100 to Save the Children, 100 to World Education, and others to various GreenCOM partners, including USAID/Bamako.

1.4 A functional desktop publishing system is established.

As a result of a desktop-publishing workshop, desktop publishing system are now in place and personnel are able to use the system at both WALIA and IPN. In July 1999, WALIA had already produced its first newsletter aimed at students, parents, and teachers who are associated with environmental youth clubs. In August 1999, IPN produced its first newsletter for teachers in EE. In addition, a desktop publishing system is also in place at the GreenCOM office in Bamako,

GreenCOM has printed 1000 copies of the WALIA newsletter. GreenCOM has also established Internet connectivity for IPN and WALIA.

1.5 A monitoring system, to collect data and report results, is established and functional.

A pre-test on student knowledge was administered by Sekou Diarra, a Malian researcher, and by IPN, in the 18 schools that were selected as “pilot schools.” In each of the Bamako, Koulikoro, and Sikasso regions, three schools were chosen: one a public school (trained by PFIE, the ten-year European Community-funded EE project), one a public school not trained by PFIE, and one community school. This pre-test aimed at assessing the impact of training teachers in the use of the Teacher’s Guide. A post-test was done by the same team, led by Sekou Diarra. Thus the entire pre-test post-test study was co-designed with Malian institutions and implemented and analyzed by these same Malian institutions. With the installation of the desktop publishing system at IPN, all data entry and analyses were done by Malians, and their reports were disseminated.

Results of the pre-test were analyzed and reported by Sekou Diarra early in 1999. Another study done on the impact of interactive/participatory methods, using the Activity Booklet along with the Teacher’s Guide, was conducted in May 1999, and results published in August.

An additional factor that helped enrich the research effort was Mr. Diarra’s involvement in another GreenCOM study, this one on school/community linkages in Mali. The main finding of that study was that the continual engagement of the teacher in following through on community school activities is the most critical factor. Without the sustained involvement of the teacher, the school/community linkage remained weak at best. The statistical analysis of these studies was completed at IPN, where a statistical package, SPSS, had been installed; GreenCOM consultant Sekou Diarra assisted the IPN team in the preparation of the questionnaires, sampling methodologies, and computer analysis of all the studies.

2. Informal Education: Training of 29 Community Radio Journalists

Community radio has a long tradition in Mali, remarkably. In most African countries state control and operation of both radio and television is the norm, but Mali has long allowed the growth of small, local-language radio stations. The rural stations have small but loyal audiences, owing to the fact that Mali’s rural population is sparse and to the fact that the community-station programming is geared to that small audience. Recognizing this opportunity, GreenCOM developed a working relationship with 29 community-radio stations as well as with a trainer from the National Radio and Television Association (ORTM). With 70% of Malian young people not in school, radio offers the best channel for reaching young audiences and women with targeted EE messages that address specific environmental behavior. The audiences of these 29 stations, in fact, represent over 60 percent of Mali’s population of 10 million.

Accordingly, GreenCOM provided training for radio journalists from 29 community-radio stations. The journalists received instruction in radio reporting, environmental reporting, and

evaluation of radio programs. The training also linked them with other officials in their communities to make them real agents of change, not just reporters about change. During the training, a series of six radio programs based on real environmental concerns of communities was developed by the radio journalists; these programs have subsequently been aired frequently around the country by the training participants. In addition, these same programs have been made available to all community radio stations, not just to those that participated in the training.. Follow-up efforts show that many stations have initiated community clean-up efforts, of both public spaces (market areas in Bamako, Fana) and private spaces. At least one station launched a second station focusing exclusively on women's issues, and a woman-owned station in Bamako has developed regular outreach programs as well. A cadre of seven trainers has been developed to train others in radio production, environmental reporting, participatory environmental needs assessment, and qualitative research. These trainers come from the private sector, Ministry of Basic Education, NGOs, ORTM, and the Ministry of the Environment.

3. The Nonformal Systems SYouth and Communities

2.1 Changed behavior in 5000 youth for environmental protection. Change one behavior among 10% of the 5000 targeted youth.

In Bamako, GreenCOM took the lead in developing interactive relationships among at least 60 existing environmental agencies/institutions/individuals, to unite their efforts in support of urban issues. These individuals and groups had worked mostly independently of each other, sometimes in parallel but sometimes at cross purposes, but never together. Now, due to GreenCOM's initiative, four informal Environmental Commissions have been formed, composed of environmental agencies and individuals S municipal, NGO, private sector S working to improve solid-waste disposal. Supported by the municipal structures responsible for solid waste and by the Ministry of the Environment, but without external or foreign assistance, these Commissions have been meeting regularly to develop plans for improving solid-waste removal in Bamako.

As part of United Nations Environment Week in June 1999, GreenCOM linked up with COCAN, the agency responsible for preparing the country for the Africa Cup Games in 2002, to spearhead an urban clean-up S to use national pride and social energy as a vehicle for improving individual behavior. Preparing Bamako to host the Africa Cup Games involves a thorough housecleaning.

GreenCOM commissioned a seminal document on the role of Malian youth in their environment, focusing on out-of-school youth in particular: GreenCOM has also commissioned impact research to determine the level of environmental behavior change among youth, and has contracted with several agencies to survey men, women, and youth about urban waste issues.

ENVIRONMENT WEEK 1999.

“A cleaner, safer Bamako”

“To clean up is good, but to keep things clean is better”

These were some of the slogans produced by primary-school children in Bamako, in response to a drawing competition on cleaning up trash on the streets of Bamako.

With an 11% growth rate Bamako is one of the fastest growing cities in Africa. The sheer pressure of the population has outstripped the ability of the Department of Public Works to handle the solid or liquid wastes of the city. Consequently Bamako is now also one of the dirtiest cities in West Africa. GreenCOM used Environment Week as the opportunity to launch a campaign to encourage citizens to clean up their neighborhoods and at the same time reduce the overall amount of solid waste. GreenCOM mobilized over 60 NGO partners within Bamako, to address the issue in a concerted manner. Consequently programs managed by the Association of Household Maids ran alongside programs by the Young Men’s Enterprise groups (GIE) aimed at mobilizing householders. We were able to create partnerships among Malian groups.

“Le Foot”

In 2002 the Africa Cup Games will be held in Mali. GreenCOM has partnered with COCAN, the Government agency responsible for preparing Mali for those games, to use soccer S or “le foot” as it is known and revered in Mali S as the appeal to get young men in particular engaged in the clean-up process. The appeal for women, according to GreenCOM research, has been primarily a health message.

Activities continued through the end of the project in September 1999, engaging householders in weekly neighborhood meetings, and promoting clean-up messages using community radio.

“Beware the Bug”

That’s the health message that is passed to the neighborhood population during weekly clean-up days in neighborhoods around Bamako. With GreenCOM support, a women’s environmental NGO, COFESFA, is now mobilizing citizens on a weekly basis to manage their household waste better and to raise the profile of modern, urban personal behavior in public places. Using theater troupes to present health messages, COFESFA is providing wonderful entertainment for the population S who are at the same time learning that their own personal behavior is largely responsible for their own ill health.

“And What’s in Your Dowry?”

This is the question one young woman smugly asks to another in one radio spot. The discussion that follows points out the fact that the smug young lady has everything a modern wife needs S except for a garbage container with a lid on it. The implied message is that the modern urban bride needs to include this important vessel, as much as she needs to pack her sheets, pots and pans, and bridal stool. Otherwise she condemns her family to a dirty household and possible ill health.

During United Nations Environment Week (June 6-10, 1999), GreenCOM focused on changing the solid-waste-related behaviors of young people. The effort focused on two specific areas, one related to the management of household waste and the other related to personal behavior in a “public space.” GreenCOM teamed with several NGOs and subcontracted with several agencies including COFESFA and CНИЕCS (the National Center for Public Health Information, Education and Communication). CНИЕCS has a sound track record in conducting studies related to behavior-change assessment in health for USAID and other donors, and was therefore selected to do a study on environmental behavior change.

CНИЕCS did a preliminary KAP study and then an evaluation at the end of the campaign to see what specific behaviors specifically were changed. Results indicated that youth were beginning to significantly change behavior but that two months of transmitting EE messages via radio and of COFESFA doing street theater aimed at youth was not enough time to bring about measurable behavior change in the targeted populations. CНИЕCS asserted in their report that if the project were to go to December, there would have been enough time to measure change in behavior. Nevertheless, a significant, detectable change had begun as a result of GreenCOM activities. Targeted groups were listening to the messages about closing trash containers and about watering down their compounds before sweeping, which significantly reduces the amount of dust in the waste stream, one of the behaviors GreenCOM was attempting to change. Dust in the waste stream is a significant problem in terms of quantity, and as a result of the study done by CНИЕCS, this specific behavior was targeted.

One major stumbling block to long-term behavior change is the fact that Malian men and boys consider sanitation and garbage problems essentially a woman’s problem. This attitude has to change so that men and boys recognize that they, as well as women and girls, have essential roles in creating a cleaner, safer Bamako environment.

2.2 Ten youth centers are provided with environmental education videos and appropriate radio messages and AV training materials.

The particular youth centers with which GreenCOM was to contribute materials were not constructed. The resident advisor worked with national NGOs working with youth to reach young people.

2.3 NGOs have the capacity to monitor environmental education.

In conjunction with GreenCOM, Save the Children, WALIA, and, to a lesser extent, World Education have been involved in, and benefitted from, training teachers in environmental education and then, with GreenCOM, monitoring EE in the formal school system. Save the Children participated directly in the teacher-training program. WALIA, the environmental NGO in Mopti, has substantially increased their capacity to monitor environmental education targeted at youth both in school and out of school. In May 1999, WALIA performed follow-up visits to

schools in which they had trained teachers and formed EE clubs, to monitor EE activities. Also, along with GreenCOM, WALIA monitored the outcomes of the EE training for the 29 local radio journalists; it was WALIA who found that these journalists are now transmitting EE messages throughout the country.

In addition to these examples, GreenCOM has been working with several national and local NGOs to reach out-of-school youth. Several of these NGOs participated in a message-development workshop where they were exposed to specific measurement criteria. These same NGOs assisted CNIECS in its evaluation of the urban cleanup campaign.

Much of the lack of monitoring in Mali is primarily due to lack of means. NGOs understand the need to monitor but more often than not do not have the resources to carry out monitoring activities.

2.3 Youth Knowledgeable about Environmental Issues.

GreenCOM has exposed both in-school and out-of-school youth to a variety of educational messages about the environment. Both the radio follow-up (informal) and the CNIECS study (nonformal), as well as the pre-test and post-test studies on the impact of GreenCOM teacher training on those teachers' students in the primary-school system in Mali (formal), indicate that GreenCOM has had an impact in reaching youth. Young people in Mali are in fact now more knowledgeable about environmental issues, despite the limited time GreenCOM had to implement these educational activities.

4. Over and above fulfilling our strategic objectives for the project, GreenCOM/Mali has done the following:

4.1 Trained 420 teachers in over 100 schools in participatory/interactive/creative methods to integrate environment into the core curriculum in grades 1-6. This training was for the teachers from the regions of Mopti, Koulikoro, Bamako, and Sikasso. GreenCOM has managed to train these teachers S both public- and community-school teachers S in addition to creating a cadre of trainers from the education sector for both public and community primary schools.

4.2 Partnering financially with other donors S the German Development Agency (GTZ) and PNAE (the Malian National Action Plan for the Environment) S to train some 29 local radio journalists to transmit environmental messages targeted mainly to rural youth and women. These journalists have been trained in investigative, in-depth journalism. This makes them an essential part of a newly democratic Mali, because they can produce responsible programming on issues relevant to their public. This partnership facilitated a genuine collaboration between the Ministry of Environment and the Ministry of Basic Education which both Ministries acknowledged and continue to value. It also allowed GreenCOM to leverage its monies, conserving funds for other radio activities, to promote sustainability.

4.3 While GreenCOM was initially asked to focus on three regions of the country, we have been able, through careful conservation of our funds, to extend the program to the North, something that was requested both by the government of Mali and USAID/Bamako. There is now a GreenCOM presence in towns as dispersed as Timbuctou, Gao, and Mopti, as well as in other towns in the region, because of the radio-journalist training and through GreenCOM's close collaboration with WALIA. Twenty-two schools in the region have received trained teachers, and most of these schools now have active environmental clubs that strengthen their links with the community.

4.4 Because GreenCOM had no direct counterpart for its out-of-school activities, and because the youth centers in which GreenCOM was supposed to work never got built, GreenCOM developed close collaborative relationships with NGOs as a way to reach youth. In Bamako, GreenCOM was instrumental in mobilizing NGOs to respond to United Nations Environment Week initiatives, and beyond that to develop long-term programs dealing with urban waste. This collaboration with NGOs has depended heavily on the good will of the NGOs and municipal structures. Only one of 50 NGOs received a formal grant from GreenCOM, but 15 NGOs participated actively in urban clean-up days, youth mobilization, school drawing contests essentially for the price of a few t-shirts bearing a GreenCOM-developed logo. GreenCOM has since learned that the Department of Public Works has determined to place trash receptacles in public places as a direct result of GreenCOM activities.

After establishing a garbage pick-up program with the chauffeurs union, COFESFA, GreenCOM's subcontractor in Bamako, will place some 20 trash receptacles in the principal "auto park" in Bamako. The union will gather monies to pay for the trucks that every week will transport the rubbish to the dump. Some of the monies will go to young men's associations, which have now been formed to clean the area and empty receptacles every day.

4.5 GreenCOM was asked to make one video addressing youth environmental issues. A 15-minute video on urban solid waste has been produced by ORTM in Bambara, the most widely spoken language. However, GreenCOM has also produced more than 20 audio spots, magazines, and investigative journalism reports on different environmental issues all of which have received free airing on community radio stations around the country. It is this leveraging of resources that has perhaps been the most important reason for the success of the project to date. GreenCOM evaluations for both our formal and non-formal programs demonstrated a positive impact of its efforts.

Lessons Learned

1. The process of trust building is central to any development project and GreenCOM/Mali was no exception. Trust building takes time, and the lack of time is often a stumbling block to building sustainable trust. We were able to build up trust gradually by our highly participatory approach, both from the non-Malian side and the Malian side. Partnership calls for listening to the real needs of the "client," and though the two years allotted to GreenCOM in Mali was not

enough, it was a genuine beginning. As IPN and other GreenCOM partners experienced participation, they gained confidence in us, in themselves, and in their training abilities. The evolution of trust among our institutional partners was impressive, both within community-school and public-school participants as well as within NGOs. But our inability to stay for the long term will certainly erode what has been built.

Donor organizations need to maintain their interest and support for environmental issues in Mali for the long term. The key issues of TIME and EXPECTATIONS on the part of both donors and Malians needs to be addressed. Shifting donor strategic objectives have negatively impacted the field of environment in Mali.

2. The synergy among educators, communicators, and environmentalists was beneficial and enriching to all partners. Synergy among the formal primary-school system (grades 1-6), the informal education sector (local radio stations trained by GreenCOM), and the nonformal education sector (NGOs) came from a creative process of networking. This synergy aided the formal educators to move out of the “four walls of the classroom” into the larger community. The Director of PFIE, which only focuses on schooling in the formal sector, cited this synergy as a GreenCOM innovation and a great GreenCOM contribution to environmental education in Mali.

3. Participation meant being actively involved in learning and discussing with each other in groups while they learned; this social interaction was also emotionally stimulating and greatly enhanced the learning process. The participatory approach S creative and hands-on activities S helped to create confidence and commitment in teacher trainers and in teachers, to experiment and create new ways of teaching and learning. Teachers spend nearly 90% of their planning time devising lessons so that students will make sense of the learning objective, so that what they learn will have meaning for them. Research on how the brain learns clearly shows that meaning for learners comes through relevance, emotion, and learning in a context and pattern understandable to the learner. These elements are precisely what has been lacking in the educational system currently in place in Mali, and which GreenCOM sought to introduce.

4. The school/community relationship, particularly the school’s relationship with local radio stations, needs to be further developed. Follow-up and evaluation of radio training showed little relation between the school and the radio. This can be rectified and is potentially of extreme importance since the local radio stations in Mali are the most listened-to media of communication S they are where most Malians get their information. In addition, USAID and other donors like UNICEF and organizations like the Panos Institute have strengthened local community radio throughout Mali.

In our training of radio journalists GreenCOM used a five-person team to teach participatory methodologies. Using an interdisciplinary team to train radio journalists was more effective than using only communication specialists or only environmentalists. The effect was stimulating for the learner, because all five people had a different perspective (gender, environment, radio/TV communication, health, and policy). While the groups learned how to do needs assessments, they

also learned to ask questions in all five areas, considerably enriching future programming on their stations and deepening their knowledge of issues. In the process, GreenCOM learned that the journalists' knowledge about environmental issues was low, so we sought to help them get a better grasp of the subject, to avoid inaccuracies and stereotypes. In addition, training was done in Bambara, the major local language, and this greatly stimulated discussion, participation and learning.

5. Many of the components that are integral to EE are also integral to good education. These components are the focus for school reform movement in general and PRODEC in particular in Mali. Therefore, environmental education has been a catalyst for not only participatory learning/teaching, but also a genuine tool for improving the quality of education in Mali. Hands-on, sensory engagement during learning, learning how to work in groups and how to consult and how to lead a group-learning session S all these components have been catalysts of creativity and imagination in teacher trainers, NGOs, teachers, and students in Mali. They are also natural components within “pedagogie convergente” in which the first several years of instruction are to be in the native language, with gradual introduction of French in the 3rd and 4th years of schooling. This “pedagogie convergente” is official Malian policy and will begin to be implemented in the 1999-2000 school year.

6. Genuine orientation to local Malian needs was absolutely necessary and crucial to the project's success. This orientation to “local” needs, now an official slogan of the development community, is still very often neglected. This local focus in GreenCOM was 1) oriented to local felt needs of people and institutions, 2) had a strong link with locally generated initiatives, and 3) involved non-local professionals as genuine partners in the learning process.

7. GreenCOM/Mali's research shows that girls do more poorly in schools on environmental issues than boys, regardless of the type of school (community-owned, public or even schools that already had a specialty environmental curriculum). GreenCOM did research in 18 schools in the project areas, partly to determine a baseline of environmental knowledge, partly to determine if the structural differences between types of schools would make a difference in educational outcomes. The most consistent finding in our research had to do with girls' level of knowledge. While girls sometimes started with higher grades than boys in the earlier years (fourth grade), their scores declined substantially as they got older, while the boys' scores improved as they got older. These findings are consistent with the findings of Female Education in Math and Science in Africa (FEMSA), a UNESCO-supported research group. In primary school, all students study the same subjects, so girls' access to math and science is dependent on their rate of enrollment. FEMSA found that the major reason for the gap in performance between the boys and girls are the attitudes of teachers, students, and their parents about women/girls engaging in scientific and technological subjects.

There is a widespread belief, even among teachers, that girls are intellectually incapable of studying difficult and task-oriented subjects. There is hard evidence that girls are actively discouraged by teachers, who do not expect good performance and who do not wish to struggle

with them. Girls are also subject to severe harassment from male students. Parents have the belief that a girl who succeeds in these subjects is somehow abnormal and a poor prospect for marriage. Consequently girls suffer from very poor self-esteem.

Early signs indicate that GreenCOM's emphasis on interactive methods substantially improved girls' scores and that such an approach may be generalizable across subjects. This is substantiated by studies in the United States that point to EE as a major force in raising girls' science scores. Any follow-up to GreenCOM should expand its efforts to train teachers in interactive methods that rely on discovery learning.

8. Research reaffirms that we learn best when we are actively involved in interesting and challenging situations. The participatory/interactive/creative approach used by GreenCOM in training its partners had learners standing up, moving about (there is 15% more blood in the brain when we stand), and consulting with each other in small groups about what they were learning while they were learning it. This social interaction in an educational setting was emotionally stimulating and enhanced the learning process for these Malian students. During training, classrooms were visually appealing places where learners were both trainers and trainees. The participation fostered by GreenCOM brought out a sense of joy in learning (one of the most important of twelve "genius" qualities cited by Armstrong in her recent book on stimulating genius in the classroom). Participation also trained students how to release creativity and innovation by creating and managing small consultative groups.

Research on how we learn shows that several positive things happen with more active learning. First, there is more blood flow in the body, which brings more oxygen to the brain. Second, active learning can trigger the release of the body's good-feeling drug, endorphin, or the "challenge" hormone, adrenaline. Studies show these are excellent for the brain. In addition, the body is often activated into states of movement which makes more enthusiasm and motivation likely. And finally activities that are learned with the body are more likely to be recalled and applied at a later date. Mind-body movement gives the body more sensory clues to be able to re-address new learning in the future.

It was in this spirit that GreenCOM co-planned programs for active learning. Lessons were simple blocks of activities, designed to correspond with the body's high-low cycles of about 90 to 110 minutes. When students are at the top of these cycles, they are much more attentive. At the bottom of the cycle, energy drops and attention and learning do too. Learning to "ride with" the cycles and give physical breaks are potent energizers.

A few other tips go along with this active learning approach;

- 1) Shorten required attention time
- 2) Increase choices in learning and provide a variety of learning experiences that engages more of the senses

- 3) Boost relevance, allow choice in learning
- 4) Utilize more nonconscious learning (posters, people, music, student projects)

Strategies that ensured meaning and values in the learners:

- 1) Eliciting from participants conclusions they drew from their day's learning and its relevancy to their lives
 - 2) Meshing learning into a larger pattern of understanding. This was established in part by using small group discussions on the African situation in general and Mali in particular
 - 3) Having participants list the top things they learned and discuss them in plenary
 - 4) Triggering meaningful and powerful emotions by personal experiences in small groups, dramas, case studies, team activities, and celebrations
 - 5) Having learners list what they learned and express ideas that they want to implement and improve
 - 6) Listening to others share what they learned in the training and having everyone contribute
 - 7) Engaging trainers by having a different person each day manage the large group and appointing for each small group a facilitator and recorder/reporter who will report back to the large group
 - 8) Emphasizing and demonstrating (by direct experience) the crucial importance and power of consultation and working in groups
9. **Because there are limited access points to reach Malian youth who are not in school, it is imperative to use as many decentralized tools as possible.** GreenCOM has tried to use many channels to reach Malian youth out of school. Community radio is a recognized, powerful, and increasingly utilized resource for reaching youth with environmental messages and should be exploited more fully. GreenCOM has found that its investment in community radio has been one of its most rewarding efforts. However, in urban areas TV is usually the best channel for reaching young people. National TV broadcasts are closely followed and fashions and trends often originate there. GreenCOM had contracted with an agency to use television to transmit environmental messages, but the lack of electricity in Bamako, due to water shortages, and frequent power outages throughout Mali forced GreenCOM to abandon this strategy.

In addition, there are a few Malian-based magazines that reach educated youth. One such magazine, *Medina*, should be encouraged for its potential to reach educated women leaders, themselves activists in a variety of spheres. An investment in this magazine might support an environmental journalist for a regular column on the environment. COCAN 2002, the Malian structure for the Africa Cup Games in 2002, is also a potential, but as yet unexploited, channel for reaching youth.